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ELECTRONIC DEVICE FOR DETERMINING THE LEVEL OF NATURAL WATER POLLUTION

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Abstract
The block diagram of a simple optical fiber optoelectronic device and the optoelectronic sensor scheme are described in the article.

Keywords: water, photoreceptor, quality, optical fiber, light diode, amplifier, analog-digital converter, digital display.

Introduction

Nowadays, the problem of providing the inhabitants of the earth with clean drinking water is getting more and more complicated

The problem of natural water pollution threatens the entire humanity. It is known that each person consumes 2.7 liters of water per day (1.3 liters of water is consumed by drinking, 1.1 liters of water is used for cooking). As a result of contamination of water bodies with chemical elements through sewage, people can develop diseases that are difficult to treat.

From this point of view, control of the purity of natural water bodies is an urgent topic.

ecology , water for consumption, water for industry, and water for production use are mainly tested by laboratory tests. Chemical, electrical conductivity and electrochemical methods are widely used in these processes. These methods have high accuracy. But since these methods are implemented by sampling, they cannot provide "quick" control when "necessary". Also, since the measurement is performed for a certain volume of sample water, we cannot say that these methods have solved integrally for the total volume of water used. At the same time, in these methods, it is difficult to constantly express automatic control of acidic waters. From this point of view, the optoelectronic method shows its advantages here.

Optoelectronic control methods can be classified according to two features. Optoelectronic measurement devices (OO'Q) can work on transmitted (Fig. 2, a)) and return (Fig. 2, b)) light beams. In complex measuring devices with many parameters, the operation of several passing and returning lights can be applied. In addition, it is possible to use the light stream falling on the photoreceptor as a carrier of information about the measured parameters of the inspected object, or to transmit the image distribution in the control field from the optoelectronic pair "light source-light receiver" to the optical field of this field. information can be obtained using the fact that it is not the same sex.

The proposed fiber-optic optoelectronic water pollution detection device below provides full-scale monitoring (Figure 1).

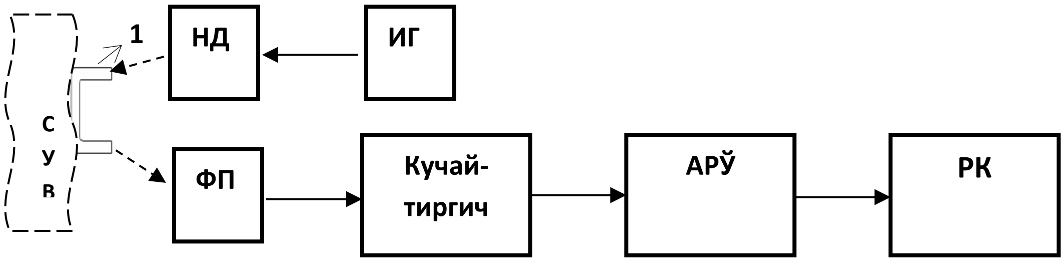
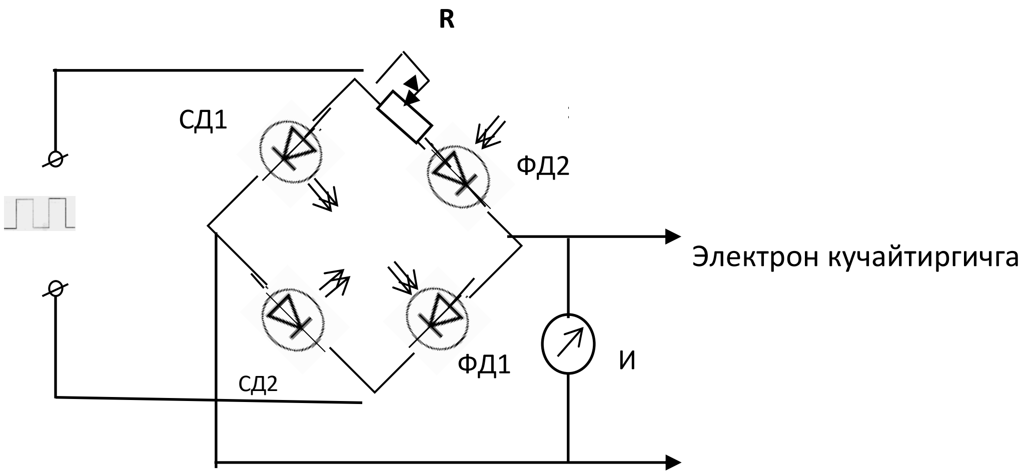


Figure 1. Block diagram of a fiber-optic optoelectronic device for detecting water pollution.

Here: 1- optical fiber, ND-light diode, IG-pulse generator, FP-photoreceiver, ARO'-analog-digital converter, digital display.

This fiber-optic optoelectronic device works as follows: - a light-emitting diode supplied by a pulse generator (IG) transmits its light to an optical fiber, which is actually attached to the surface of the water container along its height, and the intensity of the light passing through it will depend on the level of water pollution at all levels of the tank. The light passing through the optical fiber falls on the photoreceptor. The light caught in the photoreceptor is converted into an electrical signal and sent to the analog-to-digital converter (ARO') through an amplifier. In ARO, analog signals are converted into digital signals, and information about the level of water pollution is obtained on a digital display.

The primary transducer (sensor) of an electronic device that determines the level of water pollution can be built using a simple optoelectronic bridge circuit (Fig. 2).



2- picture. Scheme of the optoelectronic sensor. In the scheme: SD - LED, FD - photodiode, I - indicator.

In this scheme, the first SD1-FD1 pair is installed as a pair to measure the impurity of the monitored water, while the second SD2-FD2 pair is installed for the clean water in the sample. The first pair "SD1-FD1" operates at the measurement wavelength, the second pair "SD2-FD2"

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at the reference wavelength. If the test water and the sample water are of the same purity, the signals obtained from the pairs will be equal and the bridge will be in equilibrium.

At the beginning, i.e., as a control water, it is taken from the water in the sample, the shoulders of the bridge are equalized through the resistor R, and the indicator I is brought to zero.

Let's say that the pollution of the controlled water exceeds the norm, then the balance of the shoulders on the bridge is disturbed and the indicator pointer remains non-zero: $U_{cd} \neq 0$. The voltage change at the bridge output corresponding to the level of water pollution (U_{cd} **)** is transmitted to an electronic amplifier and amplified and fed to a comparator. Diode or transistor switches can be used as comparators. This device, when the level of water pollution exceeds the norm, the resulting electrical signal is displayed on the digital display panel. The benchmark in the comparator is predetermined by the controller.

The advantage of the sensor that determines the level of water pollution is that it has high sensitivity and ease of adjustment due to the use of a bridge circuit.

References:

1. National Encyclopedia of Uzbekistan. Volume 10. - T., 2005.
2. B a r a t o vP Tabiat muh of aza . Educational handbook . - T ., 1991.
3. A birkul o v QN, Kh o jim a t o v A .N., R a j a b o v N. Ek o l o giya - T.: 2004.
4. A birqul o v QN, A bdulq o sim o v A ., Kha md a m o v Sh. Social science , T .: 2004 .
5. A birqul o v QN, Ho jim a to v A .N., R a j a b o v N., A tr o f-muhit muh o f a z a si.T.: 2004 .
6. R a fiq o v A . A. , A birqul o v QN, X o jim a t o v A .N. Education and profit economy . _ _ _ _ _ _ _ _ _ _ _ Study manual . _ _ - T., 2004
7. Nigm a t o v A .N., Shiv a ld o v a NS, Sult a n o v RN Ek o l o giya v a b a rq a r o r riv o jl a nish. O'quv qo'll a nm a . -T., 2004
8. Kasimov NS et al. Ecology of the city. - M.: Scientific World, 2004.
9. Kosimova S. T. , Bader O. A. , Shodjalilov Sh. Protecting the environment. Urban climatology. TASI, 2005.